What Is Claimed Is:

1. A method for processing at least one section of a thin film sample on a substrate, comprising the steps of:

(a) controlling an irradiation beam generator to emit successive irradiation beam pulses at a predetermined repetition rate;

(b) masking each of the irradiation beam pulses to define a first plurality of beamlets and a second plurality of beamlets, the first and second plurality of beamlets of each of the irradiation pulses being provided for impinging the film sample and having an intensity which is sufficient to at least partially melt irradiated portions of the at least one section of the film sample;

(c) irradiating a particular portion of the at least one section of the film sample with the first beamlets of a first pulse of the irradiated beam pulses to melt first areas of the particular portion, the first areas being at least partially melted, leaving first unirradiated regions between respective adjacent ones of the first areas and being allowed to resolidify and crystallize; and

(d) after step (c), irradiating the particular portion with the second beamlets of a second pulse of the irradiated beam pulses to melt second areas of the particular portion, the second areas being at least partially melted, leaving second unirradiated regions between respective adjacent ones of the second areas and being allowed to resolidify and crystallize,

wherein the first irradiated and re-solidified areas and the second irradiated and resolidified areas are intermingled with one another within the at least one section of the film sample, and

wherein the first areas correspond to first pixels, and the second areas correspond to second pixels.

2. The method according to claim 1, wherein respective positions of the first pixels are different than respective positions of the second pixels.

3. The method according to claim 1, wherein a location of at least one of the second areas is substantially the same as a location of at least one of the first unirradiated areas.

4. The method according to claim 3, wherein the first unirradiated areas have substantially the same location as the second areas, and wherein the second unirradiated areas have substantially the same location as the first areas.

5. The method according to claim 4, wherein the first and second resolidified areas form an entire cross-section of the at least one section of the film sample.

6. The method according to claim 3, wherein the locations of the first and second areas are non-uniform.

7. The method according to claim 1, wherein edges of the second irradiated and re-solidified areas are provided at a distance from the first re-solidified areas.

8. The method according to claim 1, wherein the first beamlets have a first energy density, wherein the second beamlets have a second energy density, and wherein the first energy density is different from the second energy density.

9. The method according to claim 1, wherein the masked irradiation beam pulses further include a third plurality of beamlets which are provided for impinging the film sample and which have an intensity that is sufficient to at least partially melt irradiated portions of the at least one section of the film sample, and further comprising the step of:

(e) after step (d), irradiating the particular portion with the third beamlets to melt third areas of the particular portion, the third areas being at least partially melted to leave third unirradiated regions between respective adjacent ones of the third areas and being allowed to resolidify and crystallize.

10. The method according to claim 9, wherein the third areas correspond to the third pixels, and wherein respective positions of the first and second pixels are different than respective positions of the third pixels.

11. The method according to claim 9, wherein a location of at least one of the first and second areas is substantially the same as a location of at least one of the third unirradiated areas.

12. The method according to claim 11, wherein the location of the first and second areas are different that the location of the third areas.

13. The method according to claim 12, wherein at least one of the first and second unirradiated areas have substantially the same locations as the third areas, and wherein the third unirradiated areas have substantially the same locations as at least one of the first and second areas.

14. The method according to claim 13, wherein the first, second and third resolidified areas form an entire cross-section of the at least one section of the film sample.

15. The method according to claim 9, wherein edges of the first and second re-solidified areas are provided at a distance from the third re-solidified areas.

16. The method according to claim 9, wherein the first beamlets have a first energy density, wherein the second beamlets have a second energy density, wherein the third beamlets have a third energy density, and wherein the third energy density is different from at least one of the first energy density and the second energy density.

17. The method according to claim 1, where the second beam pulse immediately follows the first beam pulse, wherein the first areas are irradiated with the first beamlets when the film sample is provided at a first position of with respect to the

irradiation beam pulses, wherein the second areas are irradiated with the second beamlets when the film sample is provided at a second position with respect to the irradiation beam pulses, the second position being closer to a center of the at least one section of the film sample than the second position.

18. The method according to claim 17, further comprising the step of:

(f) after step (c) and before step (d), translating the film sample relative to the irradiation beam pulses so that the impingement by the first beamlet of the film sample moves from the first position to the second position.

19. The method according to claim 1, wherein, in step (c), the first areas are fully melted, and wherein in step (d), the second areas are fully melted throughout their entire thickness.

20. The method according to claim 1, further comprising the steps of:

(g) translating the film sample so that the a further portion of the film sample is provided for irradiation by the first and second beamlets, the further portion being substantially adjacent to the particular portion of the film sample; and

(h) repeating steps (c) and (d) on for the further portion of the film sample,

wherein a first edge of the further portion of the film sample overlaps a second edge of the particular portion of the film sample, and

wherein the re-solidified areas in the first edge of the further portion are intermingled with the re-solidified areas of the particular portion so as to prevent an overlap thereof.

21. The method according to claim 1, wherein at least one of the first and second areas are configured to situate therein at least one thin-film transistor.

22. A method for processing at least one section of a thin film sample on a substrate, comprising the steps of:

(a) controlling an irradiation beam generator to emit successive irradiation beam pulses at a predetermined repetition rate;

(b) masking each of the irradiation beam pulses to define a plurality of beamlets, the plurality of beamlets of each of the irradiation pulses being provided for impinging the film sample and having an intensity which is sufficient to at least partially melt irradiated portions of the at least one section of the film sample;

(c) at a first location of the film sample with respect to the irradiation beam pulses, irradiating a first portion of the at least one section of the film sample with the beamlets of a first pulse of the irradiated beam pulses to at least partially melt first areas of the at least one section, the first areas leaving first unirradiated regions between respective adjacent ones of the first areas on at least one first edge thereof, and being allowed to resolidify and crystallize; and

(d) after step (c), translating the film sample from the first location to a second location with respect to the irradiation beam pulses;

(e) after step (d) and at the second location, irradiating a second portion of the at least one section of the film sample with the beamlets of a second pulse of the irradiated beam pulses to at least partially melt second areas of the at least one section, the second areas leaving second unirradiated regions between respective adjacent ones of the second areas on at least one second edge thereof, and being allowed to resolidify and crystallize,

wherein the at least one first edge of the first portion of the at least one section of the film sample is overlapped by the at least one second edge of the second portion of the at least one section of the film sample, and wherein the first re-solidified areas and the second re-solidified areas are intermingled with one another within the at least one first edge and the at least one second edge.

23. The method according to claim 22, wherein the overlapping of the first and second resolidied areas collectively smooth a spatial distribution of a border between the first portion and the second portion of the at least one section of the film sample.

24. The method according to claim 23, wherein due to the border between the first and second portions being smoothed, a visible contrast between the first portion and the second portion of the at least one section of the film sample.

25. The method according to claim 24, the combined densities of the at least one first edge and the at least one second edge provide an adequate pixel density at the border between the first and second portions of the at least one section of the film sample.

26. The method according to claim 22,

wherein, in step (e), the second areas further leave further unirradiated regions in the second portion between respective adjacent ones of the second areas on at least one further edge thereof, and being allowed to resolidify and crystallize, and

wherein the at least one further edge is provided adjacent to the at least one second edge.

27. The method according to claim 26, wherein the at least one section is a first row of the thin film sample, wherein the first row is irradiated by the beamlets of the first and second beam pulses when the film sample is translated in a first direction with respect to the first and second beam pulses, and further comprising the steps of:

(f) positioning the film sample for irradiating a further section of the film sample, the further section being a second row of the film sample; and

(g) at a third location of the film sample with respect to the irradiation beam pulses, irradiating a first portion of the further section of the film sample with the beamlets of a third pulse of the irradiated beam pulses to at least partially melt third areas of the further section, the third areas of the further section leaving third unirradiated regions between respective adjacent ones of the third areas on at least one third edge thereof, and being allowed to resolidify and crystallize,

wherein the at least one further edge of the second portion of the at least one section of the film sample is overlapped by the at least one third edge of the second portion of the further section of the film sample, and wherein the further re-solidified

areas and the third re-solidified areas are intermingled with one another within the at least one further edge and the at least one third edge.

28. The method according to claim 22, wherein, in step (c), the first areas include additional unirradiated regions between respective adjacent ones of the first areas which are away from the at least one edge, and further comprising the steps of

(h) after step (c) and before step (d), irradiating the first portion of the at least one section of the film sample with further beamlets of the first pulse of the irradiated beam pulses to melt further areas of the first portion, the further areas being at least partially melted, leaving further unirradiated regions between respective adjacent ones of the further areas and being allowed to resolidify and crystallize,

wherein the first re-solidified areas and the further re-solidified areas are intermingled with one another within the first portion of the film sample.

29. The method according to claim 28, wherein a location of at least one of the further areas is substantially the same as a location of at least one of the additional unirradiated areas.

30. The method according to claim 29, wherein the additional unirradiated areas have substantially the same location as the further areas, and wherein the further unirradiated areas have substantially the same location as the first areas.

31. The method according to claim 30, wherein the first and further resolidified areas form an entire cross-section of the first portion of the at least one section of the film sample.

32. The method according to claim 22, wherein the at least one first edge and the at least one second edge are overlapped to form an edge area the entire surface of which is crystallized.

33. A system for processing at least one section of a thin film sample on a substrate, comprising:

a processing arrangement, which when executing a computer program, is configured to perform the following steps:

(a) controlling an irradiation beam generator to emit successive irradiation beam pulses at a predetermined repetition rate;

(b) masking each of the irradiation beam pulses to define a first plurality of beamlets and a second plurality of beamlets, the first and second plurality of beamlets of each of the irradiation pulses being provided for impinging the film sample and having an intensity which is sufficient to at least partially melt irradiated portions of the at least one section of the film sample;

(c) irradiating a particular portion of the at least one section of the film sample with the first beamlets of a first pulse of the irradiated beam pulses to melt first areas of the particular portion, the first areas being at least partially melted, leaving first unirradiated regions between respective adjacent ones of the first areas and being allowed to resolidify and crystallize; and

(d) after step (c), irradiating the particular portion with the second beamlets of a second pulse of the irradiated beam pulses to melt second areas of the particular portion, the second areas being at least partially melted, leaving second unirradiated regions between respective adjacent ones of the second areas and being allowed to resolidify and crystallize,

wherein the first re-solidified areas and the second re-solidified areas are intermingled with one another within the at least one section of the film sample, and

wherein the first areas correspond to first pixels, and the second areas correspond to second pixels.

34. The system according to claim 33, wherein respective positions of the first pixels are different than respective positions of the second pixels.

35. The system according to claim 33, wherein a location of at least one of the second areas is substantially the same as a location of at least one of the first unirradiated areas.

36. The system according to claim 35, wherein the first unirradiated areas have substantially the same location as the second areas, and wherein the second unirradiated areas have substantially the same location as the first areas.

37. The system according to claim 35, wherein the first and second resolidified areas form an entire cross-section of the at least one section of the film sample.

38. The system according to claim 35, wherein the locations of the first and second areas are non-uniform.

39. The system according to claim 33, wherein edges of the second re-solidified areas are provided at a distance from the first re-solidified areas.

40. The system according to claim 33, wherein the first beamlets have a first energy density, wherein the second beamlets have a second energy density, and wherein the first energy density is different from the second energy density.

41. The system according to claim 33, wherein the masked irradiation beam pulses further include a third plurality of beamlets which are provided for impinging the film sample and which have an intensity that is sufficient to at least partially melt irradiated portions of the at least one section of the film sample, and wherein the processing arrangement, when executing the computer program, is further configured to perform the step of:

(e) after step (d), irradiating the particular portion with the third beamlets to melt third areas of the particular portion, the third areas being at least partially melted leaving third unirradiated regions between

respective adjacent ones of the third areas and being allowed to resolidify and crystallize.

42. The system according to claim 41, wherein the third areas correspond to the third pixels, and wherein respective positions of the first and second pixels are different than respective positions of the third pixels.

43. The system according to claim 41, wherein a location of at least one of the first and second areas is substantially the same as a location of at least one of the third unirradiated areas.

44. The system according to claim 43, wherein the location of the first and second areas are different that the location of the third areas.

45. The system according to claim 44, wherein at least one of the first and second unirradiated areas have substantially the same locations as the third areas, and wherein the third unirradiated areas have substantially the same locations as at least one of the first and second areas.

46. The system according to claim 45, wherein the first, second and third resolidified areas form an entire cross-section of the at least one section of the film sample.

47. The system according to claim 41, wherein edges of the first and second re-solidified areas are provided at a distance from the third re-solidified areas.

48. The system according to claim 41, wherein the first beamlets have a first energy density, wherein the second beamlets have a second energy density, wherein the third beamlets have a third energy density, and wherein the third energy density is different from at least one of the first energy density and the second energy density.

49. The system according to claim 33, where the second beam pulse immediately follows the first beam pulse, wherein the first areas are irradiated with the first beamlets when the film sample is provided at a first position of with respect to the irradiation beam pulses, wherein the second areas are irradiated with the second beamlets when the film sample is provided at a second position with respect to the irradiation beam pulses, the second position being closer to a center of the at least one section of the film sample than the second position.

50. The system according to claim 49, wherein the processing arrangement, when executing the computer program, is further configured to perform the step of:

(f) after step (c) and before step (d), translating the film sample relative to the irradiation beam pulses so that the impingement by the first beamlet of the film sample moves from the first position to the second position.

51. The system according to claim 33, wherein, in step (c), the first areas are fully melted throughout their entire thickness, and wherein in step (d), the second areas are fully melted throughout their entire thickness.

52. The system according to claim 33, wherein the processing arrangement, when executing the computer program, is further configured to perform the steps of:

(g) translating the film sample so that the a further portion of the film sample is provided for irradiation by the first and second beamlets, the further portion being substantially adjacent to the particular portion of the film sample; and

(h) repeating steps (c) and (d) on for the further portion of the film sample, wherein a first edge of the further portion of the film sample overlaps a second edge of the particular portion of the film sample, and

wherein the re-solidified areas in the first edge of the further portion are intermingled with the re-solidified areas of the particular portion so as to prevent an overlap thereof.

53. A system for processing at least one section of a thin film sample on a substrate, comprising:

a processing arrangement, which when executing a computer program, is configured to perform the following steps:

(a) controlling an irradiation beam generator to emit successive irradiation beam pulses at a predetermined repetition rate;

(b) masking each of the irradiation beam pulses to define a plurality of beamlets, the plurality of beamlets of each of the irradiation pulses being provided for impinging the film sample and having an intensity which is sufficient to at least partially melt irradiated portions of the at least one section of the film sample;

(c) at a first location of the film sample with respect to the irradiation beam pulses, irradiating a first portion of the at least one section of the film sample with the beamlets of a first pulse of the irradiated beam pulses to at least partially melt first areas of the at least one section, the first areas leaving first unirradiated regions between respective adjacent ones of the first areas on at least one first edge thereof, and being allowed to resolidify and crystallize;

(d) after step (c), translating the film sample from the first location to a second location with respect to the irradiation beam pulses; and

(e) after step (d) and at the second location, irradiating a second portion of the at least one section of the film sample with the beamlets of a second pulse of the irradiated beam pulses to at least partially melt second areas of the at least one section, the second areas leaving second unirradiated regions between respective adjacent ones of the second areas on at least one second edge thereof, and being allowed to resolidify and crystallize,

wherein the at least one first edge of the first portion of the at least one section of the film sample is overlapped by the at least one second edge of the second portion of the at least one section of the film sample, and wherein the first re-solidified areas

and the second re-solidified areas are intermingled with one another within the at least one first edge and the at least one second edge.

54. The system according to claim 53, wherein the overlapping of the first and second resolidied areas collectively smooth a spatial distribution of a border between the first portion and the second portion of the at least one section of the film sample.

55. The system according to claim 54, wherein due to the border between the first and second portions being smoothed, a visible contrast between the first portion and the second portion of the at least one section of the film sample.

56. The system according to claim 55, wherein the combined densities of the at least one first edge and the at least one second edge provide an adequate pixel density at the border between the first and second portions of the at least one section of the film sample.

57. The system according to claim 53,
wherein, in step (e), the second areas further leave further unirradiated regions in the second portion between respective adjacent ones of the second areas on at least one further edge thereof, and being allowed to resolidify and crystallize, and

wherein the at least one further edge is provided adjacent to the at least one second edge.

58. The system according to claim 57, wherein the at least one section is a first row of the thin film sample, wherein the first row is irradiated by the beamlets of the first and second beam pulses when the film sample is translated in a first direction with respect to the first and second beam pulses, wherein the processing arrangement, when executing the computer program, is further configured to perform the steps of:

(f) positioning the film sample for irradiating a further section of the film sample, the further section being a second row of the film sample; and

(g) at a third location of the film sample with respect to the irradiation beam pulses, irradiating a first portion of the further section of the film sample with the beamlets of a third pulse of the irradiated beam pulses to at least partially melt third areas of the further section, the third areas of the further section leaving third unirradiated regions between respective adjacent ones of the third areas on at least one third edge thereof, and being allowed to resolidify and crystallize,

wherein the at least one further edge of the second portion of the at least one section of the film sample is overlapped by the at least one third edge of the second portion of the further section of the film sample, and

wherein the further re-solidified areas and the third re-solidified areas are intermingled with one another within the at least one further edge and the at least one third edge.

59. The system according to claim 53, wherein, in step (c), the first areas include additional unirradiated regions between respective adjacent ones of the first areas which are away from the at least one edge, wherein the processing arrangement, when executing the computer program, is further configured to perform the step of:

(h) after step (c) and before step (d), irradiating the first portion of the at least one section of the film sample with further beamlets of the first pulse of the irradiated beam pulses to melt further areas of the first portion, the further areas being at least partially melted, leaving further unirradiated regions between respective adjacent ones of the further areas and being allowed to resolidify and crystallize, and

wherein the first re-solidified areas and the further re-solidified areas are intermingled with one another within the first portion of the film sample.

60. The system according to claim 59, wherein a location of at least one of the further areas is substantially the same as a location of at least one of the additional unirradiated areas.

61. The system according to claim 60, wherein the additional unirradiated areas have substantially the same location as the further areas, and wherein the further unirradiated areas have substantially the same location as the first areas.

62. The system according to claim 61, wherein the first and further resolidified areas form an entire cross-section of the first portion of the at least one section of the film sample.

63. The system according to claim 53, wherein the at least one first edge and the at least one second edge are overlapped to form an edge area the entire surface of which is crystallized.

64. A method for processing at least one section of a thin film sample on a substrate, comprising the steps of:

(a) controlling an irradiation beam generator to emit successive irradiation beam pulses at a predetermined repetition rate;

(b) masking each of the irradiation beam pulses to define a first plurality of beamlets and a second plurality of beamlets, the first and second plurality of beamlets of each of the irradiation pulses being provided for impinging the film sample and having an intensity which is sufficient to at least partially melt irradiated portions of the at least one section of the film sample;

(c) irradiating a particular portion of the at least one section of the film sample with the first beamlets of a first pulse of the irradiated beam pulses to melt and crystallize first areas of the particular portion; and

(d) after step (c), irradiating the particular portion with the second beamlets of a second pulse of the irradiated beam pulses to melt and crystallize second areas of the particular portion,

wherein the first irradiated areas and the second irradiated areas are intermingled with one another within the at least one section of the film sample,

wherein a pulse irradiation history of the first irradiated areas is different than a pulse history of the second irradiated areas, and

wherein the first areas correspond to first pixels, and the second areas correspond to second pixels.

65. A method for processing at least one section of a thin film sample on a substrate, comprising the steps of:

(a) controlling an irradiation beam generator to emit successive irradiation beam pulses at a predetermined repetition rate;

(b) masking each of the irradiation beam pulses to define a plurality of beamlets, the plurality of beamlets of each of the irradiation pulses being provided for impinging the film sample and having an intensity which is sufficient to at least partially melt irradiated portions of the at least one section of the film sample;

(c) at a first location of the film sample with respect to the irradiation beam pulses, irradiating a first portion of the at least one section of the film sample with the beamlets of a first pulse of the irradiated beam pulses to at least partially melt and crystallize first areas of the at least one section; and

(d) after step (c), translating the film sample from the first location to a second location with respect to the irradiation beam pulses;

(e) after step (d) and at the second location, irradiating a second portion of the at least one section of the film sample with the beamlets of a second pulse of the irradiated beam pulses to at least partially melt and crystallize second areas of the at least one section,

wherein the at least one first edge of the first portion of the at least one section of the film sample is overlapped by the at least one second edge of the second portion of the at least one section of the film sample,

wherein a pulse irradiation history of the first irradiated areas is different than a pulse history of the second irradiated areas, and

wherein the first irradiated areas and the second irradiated areas are intermingled with one another within the at least one first edge and the at least one second edge.